# UNITED STATES PATENT AND TRADEMARK OFFICE

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/591,122 | 06/09/2000 | Joseph L. Hellerstein | YOR000146US1 | 3432 |

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| EXAMINER |
|---|
| THANGAVELU, KANDASAMY |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2123 | 3 |

DATE MAILED: 08/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

| | Application N . | Applicant(s) |
|---|---|---|
| **Office Action Summary** | 09/591,122 | HELLERSTEIN ET AL. |
| | Examin r | Art Unit |
| | Kandasamy Thangavelu | 2123 |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Peri d for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on <u>09 June 2000</u> .

2a)☐ This action is **FINAL**.    2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) <u>1-20</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-20</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>09 June 2000</u> is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____ .

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1)☒ Notice of References Cited (PTO-892)

2)☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u> .

4)☐ Interview Summary (PTO-413) Paper No(s). _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: .

# DETAILED ACTION

## *Introduction*

1.      Claims 1-20 of the application have been examined.

## *Information Disclosure Statement*

2.      Acknowledgment is made of the information disclosure statements filed on June

9, 2000 together with copies of the patents and papers.  The patents and papers have

been considered in reviewing the claims.

## *Drawings*

3.      The draft person has objected to the drawings; see a copy of Form PTO-948 for

an explanation.

## *Specification*

4.      The disclosure is objected to because of the following informalities:

Page 9, Line 21 refers to model accessor 240 while in Figure 2 it is referred to as

Model Assessor 240. This is a discrepancy.

Page 10, Line 6, "The sub-model accept two kinds of requests:" appears to be

incorrect and it appears it should be  "The sub-models accept two kinds of requests:".

Appropriate corrections are required.


## Claim Objections


5.      The following is a quotation of 37 C.F.R § 1.75 (d)(1):

> The claim or claims must conform to the invention as set forth in the remainder of the
> specification and terms and phrases in the claims must find clear support or antecedent basis in
> the description so that the meaning of the terms in the claims may be ascertainable by reference
> to the description.


6.      Claims 7 and 16 are objected to because of the following informalities:

Claim 7, Line 1, "the sub-model at least one of computes and stores" appears to

be incorrect and it appears that it should be "the sub-model computes and stores".

Claim 16, Line 1, "the sub-model at least one of computes and stores" appears

to be incorrect and it appears that it should be "the sub-model computes and stores".

Appropriate corrections are required.


## Claim Interpretations


7.      In Claim 6, Line 1, "the sub-model at least one of computes and stores" has been

interpreted as "the sub-model computes and stores".

In Claim 16, Line 1, "the sub-model at least one of computes and stores" has been

interpreted as "the sub-model computes and stores".


### Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

9. Claims 1-3, 6-12 and 15-20 are rejected under 35 U.S.C. 102(e) as being anticipated by

**Hellerstein et al. (HE)** (U.S. Patent 6,430,615).

9.1 **HE** teaches Predictive model based measurement acquisition employing a predictive

model operating on manager system and a managed system. Specifically, as per Claim 1, **HE**

teaches an apparatus for providing on-line adaptive predictions for use by one or more

applications used in association with one or more operations for which predictions may be

requested (CL4, L14-16, CL5, L9-38; Fig 1A);

the predictions being performed in accordance with at least one model which includes

one or more sub-models (CL13, L2-43); the apparatus comprising:

at least one processor operative to at least one of: (i) adapt at least one of the one or more

sub-models, to be used in computing on-line predictions, when a change is detected in data

associated with the one or more operations for which predictions may be requested (CL5, L35-

47, CL13, L2-43); and

(ii) compute one or more predictions, in response to one or more requests from the one or more applications, using the one or more sub-models determined to provide an optimum prediction combination (CL13, L8-11; CL4, L20-22).

Dependent claims

Per Claim 2: **HE** teaches that the adapting operation further comprises estimating one or more parameters associated with each of the one or more sub-models based on data received with respect to the detected change (CL13, L45-49; CL5, L23-26).

Per Claim 3: **HE** teaches that the one or more estimated parameters for a sub-model are used to update a descriptor associated with the sub-model (Fig 1, Item 142; CL13, L45-53).

Per Claim 6: **HE** teaches that a sub-model maintains data used to estimate one or more parameters associated therewith (CL13, L45-49).

Per Claim 7: **HE** teaches that a sub-model at least one of computes and stores one or more values associated with one or more sub-model parameters (Fig 6B; CL13, L16-43).

Per Claim 8: **HE** teaches that the prediction computing operation further comprises computing a prediction for each of the one or more sub-models determined to provide the optimum prediction combination (Fig 6B; CL13, L16-43).

Per Claim 9: **HE** teaches that the prediction computing operation further comprises combining the results of the one or more computed predictions (Fig 6B; CL13, L16-43).

9.2     As per Claim 10, **HE** teaches a method of providing on-line adaptive predictions for use by one or more applications (CL4, L14-16, CL5, L9-38; Fig 1A). All the claim limitations are

the same as the claim limitations in the apparatus claim 1 and are taught by **HE** as explained in

Paragraph 9.1 above.


Per Claims 11-12 and 15-18, these are rejected based on the same reasoning as Claims 2-

3 and 6-9, as shown above.  Claims 11-12 and 15-18 are method claims reciting the same

limitations as Claims 2-3 and 6-9, as taught throughout by **HE**.


9.3     As per Claim 19, **HE** teaches article of manufacture for providing on-line adaptive

predictions comprising a machine readable medium containing one or more programs which

when executed implement at least one of the steps (CL4, L14-16, CL5, L9-38; Fig 1A).  The

computer of the apparatus contains a machine readable medium containing one or more

programs. All the claim limitations are the same as the claim limitations in the apparatus claim 1

and are taught by **HE** as explained in Paragraph 9.1 above.


Per Claim 20, this is rejected based on the same reasoning as Claim 6, as shown above.

Claim 20 is an article of manufacture claim reciting the same limitation as Claim  6, as taught

throughout by **HE**.


### *Claim Rejections - 35 USC § 103*


10.     The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

11.      The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459

(1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

    1.      Determining the scope and contents of the prior art.
    2.      Ascertaining the differences between the prior art and the claims at issue.
    3.      Resolving the level of ordinary skill in the pertinent art.
    4.      Considering objective evidence present in the application indicating obviousness
            or nonobviousness.

12.      Claims 4-5 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over

**Hellerstein et al. (HE)** (U.S. Patent 6,430,615) in view of **Basseville et al (BAE)** (IEEE, 1991).

12.1     As per claim 4, **HE** teaches the apparatus of Claim 2.   **HE** also teaches the adapting

operation further comprises testing for accuracy of the model (CL5, L35-38).   **HE** does not

expressly teach the adapting operation further comprises testing for a change-point condition.

**BA** teaches the adapting operation further comprises testing for a change-point condition (Pg

2586, CL2, Para 2; Pg 2588, CL1, Para 3), as change point detection are of great interest in

quality control, seismic and speech data processing and fault detection in measurement systems

and industrial processes (Pg 2586, CL1, Para 2).   It would have been obvious to one of ordinary

skill in the art at the time of Applicants' invention to modify the apparatus of **HE** with the

apparatus of **BA** that included adapting operation further comprising testing for a change-point

condition, as change point detection would be of great interest in quality control, seismic and

speech data processing and fault detection in measurement systems and industrial processes.


Per Claim 5: **HE** and **BA** teach the apparatus of Claim 4. **HE** also teaches the adapting

operation further comprises determining an optimum combination of sub-models, that may be

used to compute at least one of the requested predictions, in view of the detected change (CL12,

L42-45; CL12, L56-63 CL13, L11-43).


Per Claims 13-14, these are rejected based on the same reasoning as Claims 4-5, as

shown above. Claims 13-14 are method claims reciting the same limitations as Claims 4-5, as

taught throughout by **HE** and **BA**.


### Conclusion


13.     The prior art made of record and not relied upon is considered pertinent to the

Applicants' disclosure.


The following patents and papers are cited to further show the state of the art at

the time of Applicants' invention with respect to adaptive prediction and adaptive control

using multiple models and sub-models and change point detection .

1.  Shah, "Adaptation to unmeasured variables", U.S. Patent 6,230,062, May
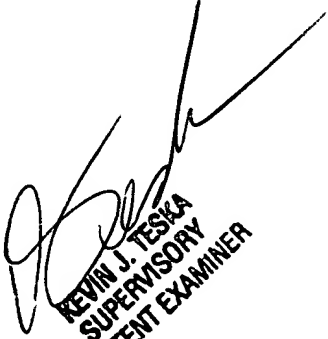
    2001.

2. Karimi et al., "Robust adaptive control of a flexible transmission system using multiple models", IEEE 1998.

3. Suzuki et al., "Adaptive active noise cancellation apparatus", U.S. Patent 5,251,262, October 1993.

4. Hong et al., "Cascade boosting for predictive models", U.S. Patent 6,546,379, April 2003.

14.    Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kandasamy Thangavelu whose telephone number is 703-305-0043. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:30 PM.

If attempts to reach examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Teska, can be reached on (703) 305-9704. The fax phone number for the organization where this application or proceeding is assigned is 703-746-7329.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-9600.

K. Thangavelu
Art Unit 2123
August 18, 2003